

## REMARKS

This Amendment is fully responsive to the final Office Action mailed June 3, 2009. It is respectfully submitted that the claims contain limitations that patentably define over the references cited by the Examiner, for the reasons discussed in these remarks. Therefore, reconsideration and allowance of the pending claims is appropriate and respectfully requested.

### *Amendments to Specification Made in Previous Amendment*

In the previous amendment filed on March 11, 2009, amendments to the specification were requested. The June 3, 2009 Office Action does not indicate whether those amendments were in fact entered. It is requested that the amendments be formally entered.

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### *Claims 1 and 9*

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The final Office Action maintains the rejections of independent claims 1 and 9 under 35 U.S.C. § 102(b) as being anticipated by US 2003/0146913 to Shen et al. (hereafter “Shen”). It is requested that these rejections be reconsidered and withdrawn because Shen does not disclose selecting object constituents to be registered independently from the first image and the second image, as recited in both claim 1 and claim 9.

This exemplary feature of the invention is described, for example, in the present application at page 2, lines 16 to 26 (emphasis added):

The registration of only those image areas of the two images which are associated with selected corresponding object constituents, the selected object components having to be relevant to the task in hand. As a rule, the user of the data processing unit determines in advance which object constituents are “relevant” in a given situation. In the trend control of lung tumors, for instance, the lungs are the relevant object constituents.

The data processing unit described above offers the advantage that it allows a fully automatic registration of the images, the segmentation and the subsequent restriction of the registration to relevant image areas allowing, in the context of the given task, both a very precise and a fast execution. Individual user actions are not always necessary. The user merely decides (for instance by selecting an application-specific program mode) which object constituents are relevant to the task in hand and therefore to be registered.

This determination in advance, i.e. independently from the first image and the second image to be registered, is not disclosed in Shen.

Shen describes a two step method for registering two lung images. In the first step (see Shen ¶¶ 0024 to 0029, and Figure 2), a calibration procedure is used to perform a “rough alignment” representing a linear transformation between the two lung images. The rough alignment linear transformation parameters are “based on the areas and boundaries of the two lungs.” See Shen, ¶ 0026. “In order to get the area and boundary information, the two lungs are segmented 110 from the image sets for each slice, mainly by techniques related to thresholds. Afterwards, the boundaries are obtained by boundary tracing 120.” See *id.* “The alignment parameters are rough estimations of the transformations between the two image sets . . . .” See Shen, ¶ 0029. Thus the result of this first step is a rough pre-registration of the two image sets.

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In the second step of Shen (see Shen ¶¶ 0030 to 0041, and Figure 3), a user interactively indicates a relevant reference point on a first image, such as a nodule in the lung. See Shen, ¶ 0030. For example, according to Shen, “the system of the invention provides a graphical user interface (GUI) 30 that allows the user to browse through the volume data and select a volume-of-interest from one data set that includes an object of interest, such as a nodule 60.” See Shen, ¶ 0023 (emphasis added). A volume-of-interest or VOI is defined around the click point in the first image. See Shen, ¶ 0030. Using the rough pre-registration linear transformation resulting from the first step, the location on the second image which corresponds to the indicated reference point is then calculated. See *id.* Next, searching in the proximity of the corresponding location in the second image as defined by a search window, a set of corresponding VOI’s in the second image is identified. See *id.* The VOI from that set which is most similar to the VOI of the first image is identified by using a matching procedure, such as grayscale cross-correlation, sum of absolute differences, thresholding followed by summation of inclusive OR, or surface matching. See Shen, ¶¶ 0030 to 0041.

Neither of the two steps in the Shen registration method is a selection of object constituents independently from the first image and the second image, as recited in both claim 1 and claim 9. The first “rough alignment” step of Shen is not a registration at all. Rather, it is merely a rough pre-registration alignment. This is established, for example, by the need in the

second step of using a complicated matching procedure to match the VOI's. If the "rough alignment" results of the first step of Shen were a true registration, then there would be no need for such matching procedures in the second step. Rather, Shen could just use the "rough alignment" of the first step to determine the location of the corresponding VOI in the second image, if it were indeed a true registration. But it clearly is not.

The second step of Shen is not a selection of object constituents independently from the first image and the second image. Rather, a user interactively indicates a relevant reference point on a first image for registration, such as a nodule in the lung. Then, using the rough pre-registration linear transformation resulting from the first step, the location on the second image which corresponds to the indicated reference point is then calculated and a search of nearby VOI's is made to find the one most similar to the selected VOI of the first image. Thus, selecting the VOI in the first image to be registered is an integral part of the registration process in Shen.

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For at least these reasons, Shen does not disclose a selection of object constituents to be registered independently from the first image and the second image, as recited in both claim 1 and claim 9. Therefore, Shen does not disclose each and every limitation of these claims, and the rejection of these claims as being anticipated by Shen should be reconsidered and withdrawn.

#### ***Claim 10***

The Office Action maintained the rejection of claim 10 under 35 U.S.C. § 102(b) as being anticipated by US 2003/0072479 to Sofia Totterman et al. (hereafter "Sofia Totterman"). In the current amendment, claim 10 has been amended to depend from claim 9. Therefore it is requested that the rejection of claim 10 be withdrawn, for the reasons provided above regarding claim 9.

#### ***Claims 2 Through 8***

Claims 2 through 8 each depend from claim 1. The Office Action rejected each of these dependent claims under 35 U.S.C. § 103(a) as being unpatentable over Shen (discussed above in connection with claim 1) in view of one other companion reference. In each rejection, Shen was relied upon as teaching the limitations of claim 1, and the companion reference was cited as teaching the limitations of one or more dependent claim. For at least the reason identified above, however, Shen does not anticipate claim 1. On that same basis, it is respectfully submitted that

the corresponding obviousness rejections of the dependent claims should be reconsidered and withdrawn.

*New Claims 11 to 17*

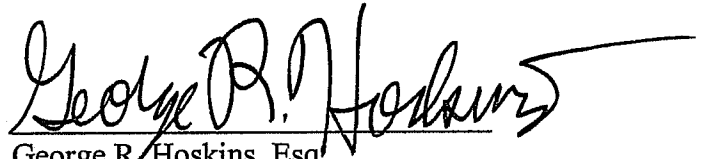
New dependent claims 11 to 17 have been added herein. It is respectfully submitted that they are allowable over the art of record.

*Conclusion*

This Amendment is fully responsive to the final Office Action mailed June 3, 2009. It is respectfully submitted that the claims contain limitations that patentably define over the references cited by the Examiner, for the reasons provided in the remarks above. Therefore, reconsideration and allowance of the pending claims is appropriate and respectfully requested.

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Respectfully submitted,

A handwritten signature in black ink, reading "George R. Hoskins", with a long horizontal flourish extending to the right.

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